

Claims	Accused Product: Ametek Inc(SurgeX) UPS-1000-OL
1. An apparatus for generating a signal indicative of a battery remaining time, comprising:	<p>The accused product provides an apparatus for generating a signal indicative of a battery remaining time (e.g., Battery Info which is an indicative of battery remaining time, displayed on the LCD display of the accused device.)</p>  <p><a href="https://www.ametekesp.com/surgex/ups-standalone/ups-standalone-120-208v">https://www.ametekesp.com/surgex/ups-standalone/ups-standalone-120-208v</a></p>



## Online Battery Backup



**UPS-1000-OL - 1000 VA UPS**

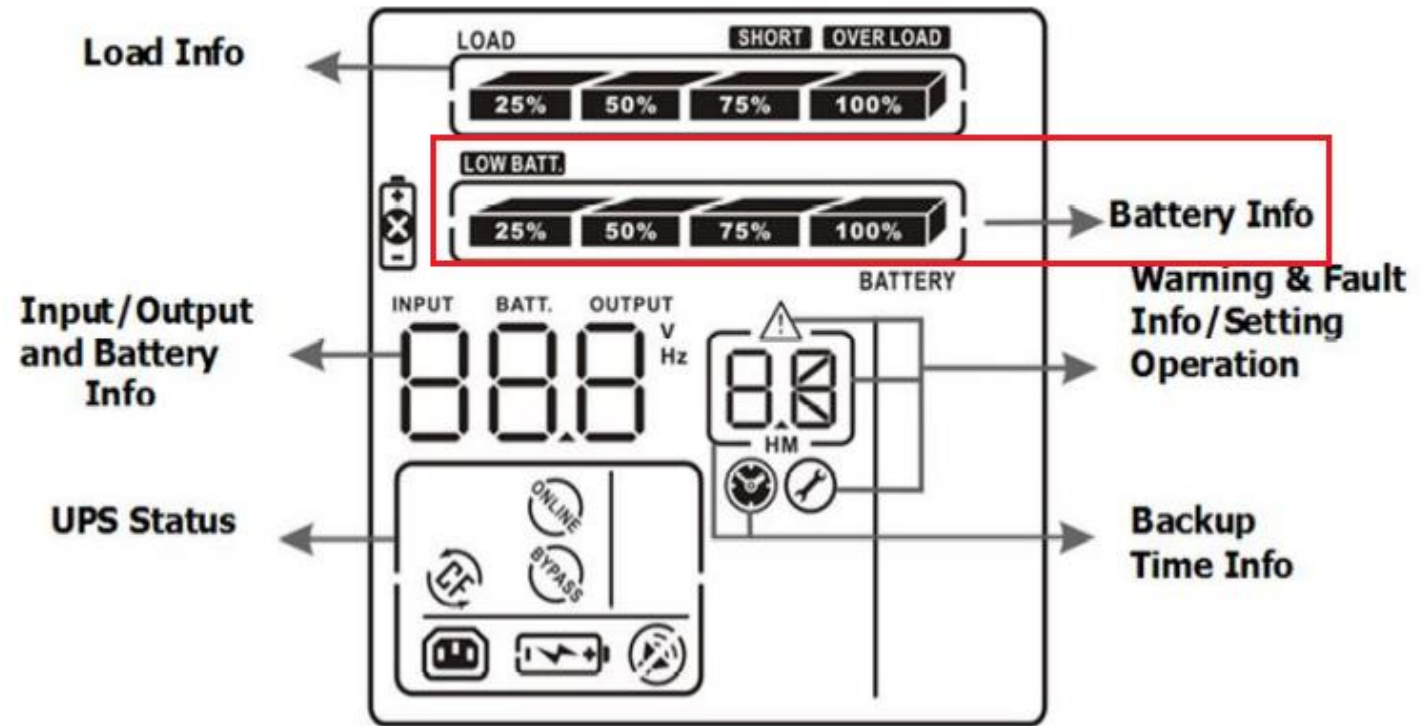
**UPS-2000-OL - 2000 VA UPS**

**UPS-3000-OL - 3000 VA UPS**

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>



## 2.9 LCD Display

### 2.9.1 Rack Display




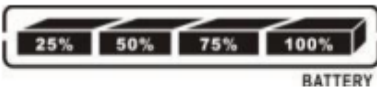



<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>

## 2.10 LCD: Display and Functional Description

Display	Function
<b>Backup time information</b>	
	Indicates the backup time.
	Indicates the backup time. H: hours, M: minutes
<b>Warning &amp; Fault information</b>	

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>


	Indicates that the UPS is in bypass mode.
	Indicates that the UPS alarm is disabled.
	Indicates that the battery charger is working.
<b>Battery information</b>	
	Indicates the battery level by 0-25%, 26-50%, 51-75%, and 76 - 100%.
<b>LOW BATT.</b>	Indicates low battery.
	Indicates that there is something wrong with the battery.

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>




## Exhibit 2

energizing a first load circuit and a second load circuit, prior to an interruption in said mains supply voltage;	<p>general outlets/direct output receptacles ), prior to an interruption in said main supply voltage (e.g., the AC input fails)</p> <p>The accused product regulates mains supply voltage for their connected loads/devices and supplies battery power upon an interruption in the mains supply voltage. The connected devices can be configured into a programmable output receptacles for non-critical devices energized by a fist load circuit and general outlets/direct output receptacles for critical devices energized by a second load circuit</p>
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## UPS Standalone

▼ 120V

UPS-1000-OL

UPS-2000-OL

UPS-3000-OL

► 240V


AMETEK Power Quality Solutions » SURGEX » UPS Standalone » 120V




120V


# UPS STANDALONE

## Standalone Battery Backup

SurgeX online double conversion  
standalone UPS battery backup solutions  
deliver clean continuous power, via online  
double conversion technology, to ensure  
 the safe shutdown of equipment in the  
 event of an outage. All incoming power is  
 converted from AC to DC and then back to  
 AC. If the main power is interrupted, the  
 batteries are still holding up the incoming  
 DC supply to the inverter, so the load





<https://www.ametekesp.com/surgex/ups-standalone/ups-standalone-120-208v>

## **Online Double Conversion**

AC power is stable and clean upon generation. But during transmission and distribution, it is subject to voltage sags, spikes and complete failure that may interrupt computer operations, cause data loss and damage equipment. When it comes to safeguarding critical IT loads, only online double conversion technology protects fully against all these power problems, providing the highest levels of security for networks.

An online UPS system is usually called double conversion as well because incoming power is converted to direct current (DC) and then converted back to AC. This AC-DC/DC- AC design ensures an increased degree of isolation of the load from the irregularities on the main supply.

The online UPS takes the incoming AC power supply and converts it to DC using a rectifier to feed the battery and the connected load via the inverter so that no power transfer switches are necessary. If the main AC input fails, the rectifier drops out of the circuit and the batteries keep the power flowing to the device connected to the UPS. When AC input power is restored, the rectifier resumes carrying most of the load and begins charging the batteries.

Because power runs through an online UPS continually, output is a perfect sine wave. This type of UPS protects the critical load from virtually all power disturbances, including subtle harmonics and waveform distortion.

This means the quality of power from online UPS is significantly better than that of other technologies. Offline and line-interactive technologies reduce the impact of spikes, surges and sags by either clipping the peaks and valleys, boosting power or switching to battery backup. Within the normal track of an electrical sine wave, however, most power fluctuations are left alone. Online UPS regenerates the sine wave, not just conditioning of the raw utility supply.

An online UPS delivers continuous, high-quality AC power to equipment with no break when transferring to battery, protecting equipment from virtually all power disturbances due to blackouts, brownouts, sags, surges or noise interference. A true online, double-conversion UPS provides 100% power conditioning, zero transfer time to battery, no change in output voltage and better transient suppression than line-interactive units.

Online double conversion is the most common UPS mode of operation used for protecting large data centers by providing the highest level of power quality to the load always. Online systems also provide frequency regulation, essential for use with backup generator systems to protect from variations common at generator start up.

<https://www.vertiv.com/en-emea/about/news-and-insights/articles/educational-articles/what-are-the-different-types-of-ups-systems/>



### 5.3 Connect Devices to the UPS

After the UPS has been turned on, devices (load) can now be connected to the UPS. For socket-type outputs, there are two kinds of outputs: programmable outlets and general purpose outlets. Connect non-critical devices to the programmable outlets and critical devices to the general outlets. During power failure, you may extend the backup time to critical devices by enabling the programmable outlets (see Sections 4.2.5 and 4.2.6).

- 1) With the UPS on-line switch on the load devices one by one. The LCD display panel will display the load level by 0-25%, 26-50%, 51-75% and 76-100%.
- 2) If the UPS is overloaded the audible alarm will beep twice every second and the LCD display panel will display "OVERLOAD".
- 3) When the UPS is overloaded remove some load immediately.

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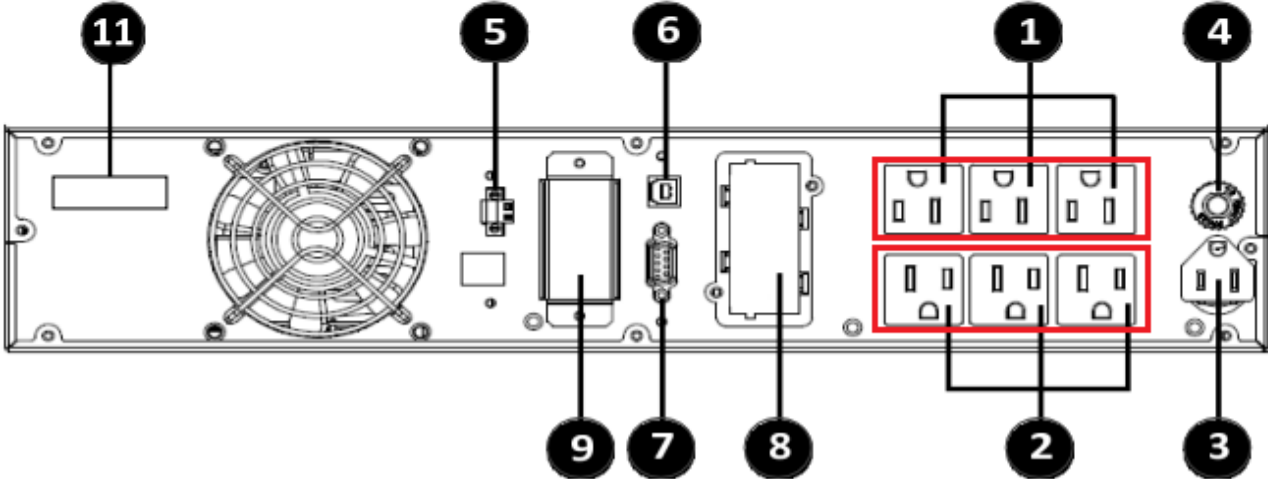


	<p><b>2.8 Rear Panel View</b></p> <div data-bbox="506 337 1545 529"> <ol style="list-style-type: none"> <li>1. <u>Programmable Output Receptacles</u></li> <li>2. <u>Direct Output Receptacles</u></li> <li>3. AC Input</li> <li>4. Input Circuit Breaker</li> <li>5. Emergency Power Off Function Connector (EPO)</li> <li>6. USB Communication Port</li> <li>7. RS232 Communication Port</li> <li>8. SNMP Intelligent Slot</li> <li>9. External Battery Connector</li> <li>10. Output Circuit Breaker</li> <li>11. Serial Number</li> </ol> </div> <p><b>2.8.1 Models: UPS-1000-OL</b></p>  <p><a href="https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965">https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965</a></p>
<p>a battery for providing battery backup</p>	<p>The accused product provides a battery for providing battery backup operation to energize said second load circuit (e.g., circuit for providing energy to critical devices connected to general outlets/direct output receptacles) after said interruption in said mains supply voltage is detected (e.g., when input AC power fails and the accused product is on battery mode)</p>

Exhibit 2

operation to energize said second load circuit after said interruption in said mains supply voltage is detected; and



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## UPS Standalone

▼ 120V

[UPS-1000-OL](#)

UPS-2000-OL

UPS-3000-OL



► 240V


# 120V

## UPS STANDALONE

### Standalone Battery Backup

SurgeX online double conversion standalone UPS battery backup solutions deliver clean continuous power, via online double conversion technology, to ensure the safe shutdown of equipment in the event of an outage. All incoming power is converted from AC to DC and then back to AC. If the main power is interrupted, the batteries are still holding up the incoming DC supply to the inverter, so the load



<https://www.ametekesp.com/surgex/ups-standalone/ups-standalone-120-208v>

#### **5.4 The UPS in Battery Mode**

- 1) When the input voltage is not within the acceptable range or there is a mains failure the UPS will enter battery mode. The batteries will continue to provide an uninterrupted supply of energy to the load.
- 2) When the UPS is in battery mode the LCD display panel will display the battery level by 0-25%, 26-50%, 51-75% and 76-100% and the battery voltage. The audible alarm will beep according to the battery capacity. Normally, the audible alarm will beep once every four seconds. When the battery voltage drops to low battery voltage level, the audible alarm will beep once per second and the UPS will automatically shut down. At this time, users could switch off any non-critical loads to disable the shutdown alarm and prolong the backup time. If no more load can be removed at this time, then all loads should be shut down as soon as possible to protect the devices or to save data. Otherwise, there is a risk of data loss or load failure.

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>

### 3.3.1 Battery Connections



**CAUTION:** Column one in the table below lists each of the UPS models and column two displays the corresponding model of the extended battery pack which must be used with the UPS. **DO NOT USE** any other extended battery pack for the corresponding UPS.

UPS Model	<u>Battery Pack Model</u>
UPS-1000-OL	UPS-BPX-1000
UPS-2000-OL	UPS-BPX-2000
UPS-3000-OL	UPS-BPX-3000

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>

### 5.3 Connect Devices to the UPS

After the UPS has been turned on, devices (load) can now be connected to the UPS. For socket-type outputs, there are two kinds of outputs: programmable outlets and general purpose outlets. Connect non-critical devices to the programmable outlets and critical devices to the general outlets. During power failure, you may extend the backup time to critical devices by enabling the programmable outlets (see Sections 4.2.5 and 4.2.6).

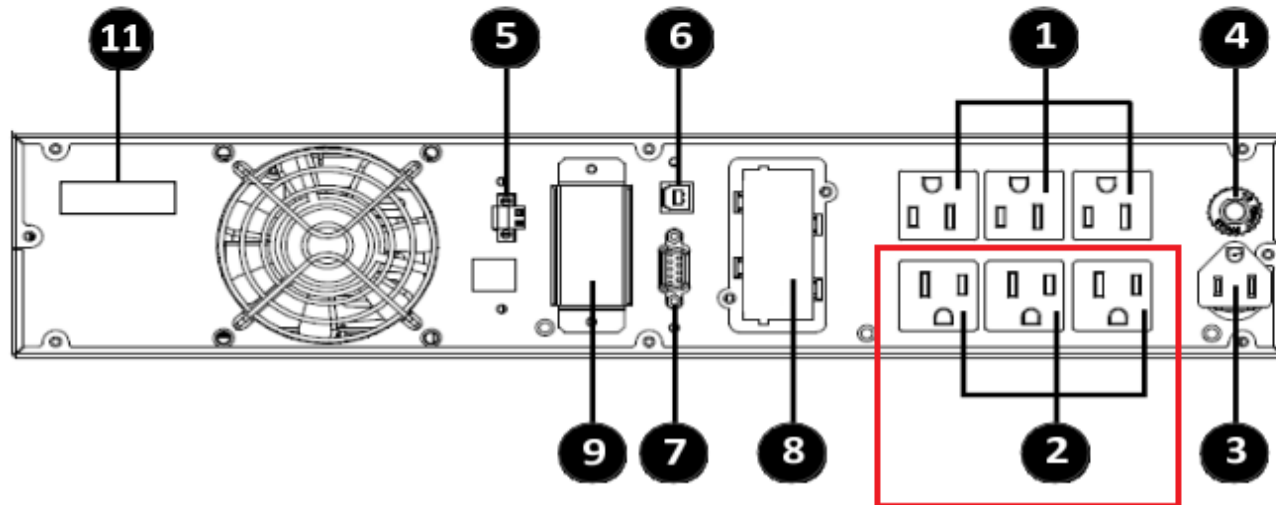
- 1) With the UPS on-line switch on the load devices one by one. The LCD display panel will display the load level by 0-25%, 26-50%, 51-75% and 76-100%.
- 2) If the UPS is overloaded the audible alarm will beep twice every second and the LCD display panel will display "OVERLOAD".
- 3) When the UPS is overloaded remove some load immediately.

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## 2.8 Rear Panel View

- |   |                               |
|---|-------------------------------|
| 1. Programmable Output Receptacles              | 7. RS232 Communication Port   |
| 2. <u>Direct Output Receptacles</u>             | 8. SNMP Intelligent Slot      |
| 3. AC Input                                     | 9. External Battery Connector |
| 4. Input Circuit Breaker                        | 10. Output Circuit Breaker    |
| 5. Emergency Power Off Function Connector (EPO) | 11. Serial Number             |
| 6. USB Communication Port                       |                               |

### 2.8.1 Models: UPS-1000-OL



<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>

a processor coupled to said first load circuit

The accused product provides a processor coupled to said first load circuit (e.g., circuit for providing energy to non-critical devices connected to programmable output receptacles ) and is configured to initiate a current drain reduction in said first load circuit after detection of said interruption (e.g., stops supplying power to devices connected to the

## Exhibit 2

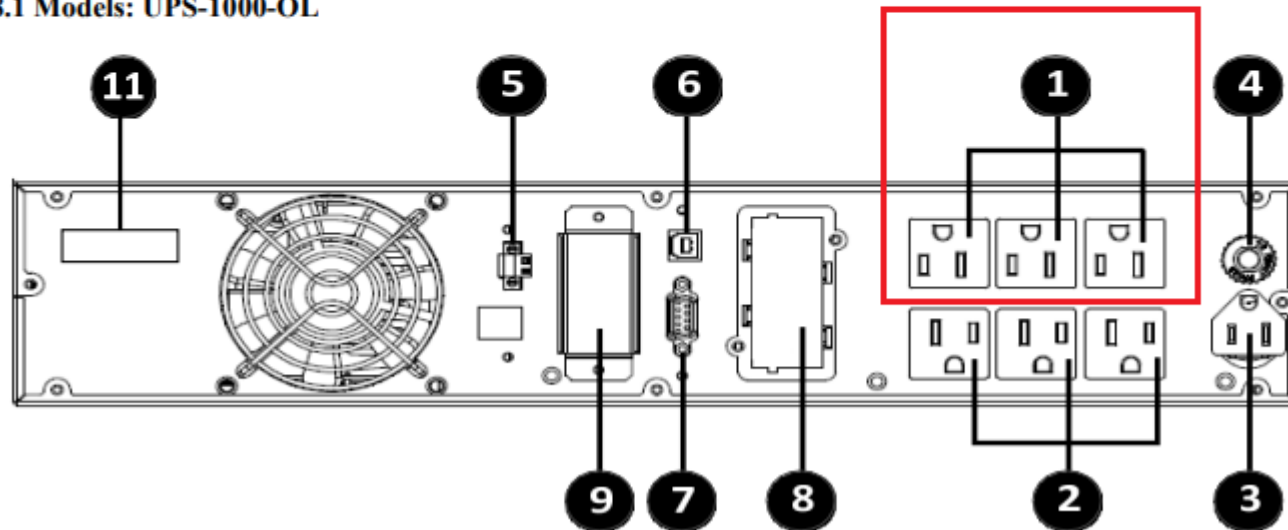
and is configured to initiate a current drain reduction in said first load circuit after detection of said interruption , and	<p>programmable outlet receptacles after Backup time when the input AC power fails and the accused device is on battery mode)</p> <p><b>5.4 The UPS in Battery Mode</b></p> <ol style="list-style-type: none"><li>1) <u>When the input voltage is not within the acceptable range or there is a mains failure the UPS will enter battery mode.</u> The batteries will continue to provide an uninterrupted supply of energy to the load.</li><li>2) When the UPS is in battery mode the LCD display panel will display the battery level by 0-25%, 26-50%, 51-75% and 76-100% and the battery voltage. The audible alarm will beep according to the battery capacity. Normally, the audible alarm will beep once every four seconds. When the battery voltage drops to low battery voltage level, the audible alarm will beep once per second and the UPS will automatically shut down. At this time, users could switch off any non-critical loads to disable the shutdown alarm and prolong the backup time. If no more load can be removed at this time, then all loads should be shut down as soon as possible to protect the devices or to save data. Otherwise, there is a risk of data loss or load failure.</li></ol> <p><a href="https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965">https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965</a></p>
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## 2.8 Rear Panel View

- |   |                               |
|---|-------------------------------|
| 1. <u>Programmable Output Receptacles</u>       | 7. RS232 Communication Port   |
| 2. Direct Output Receptacles                    | 8. SNMP Intelligent Slot      |
| 3. AC Input                                     | 9. External Battery Connector |
| 4. Input Circuit Breaker                        | 10. Output Circuit Breaker    |
| 5. Emergency Power Off Function Connector (EPO) | 11. Serial Number             |
| 6. USB Communication Port                       |                               |

### 2.8.1 Models: UPS-1000-OL



<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>

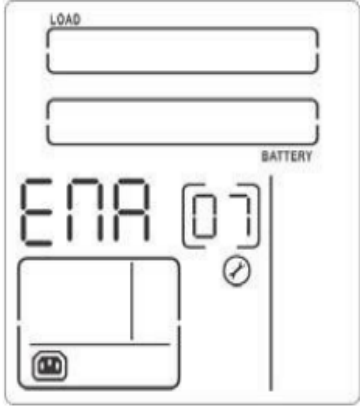
### 5.3 Connect Devices to the UPS

After the UPS has been turned on, devices (load) can now be connected to the UPS. For socket-type outputs, there are two kinds of outputs: programmable outlets and general purpose outlets. Connect non-critical devices to the programmable outlets and critical devices to the general outlets. During power failure, you may extend the backup time to critical devices by enabling the programmable outlets (see Sections 4.2.5 and 4.2.6).

- 1) With the UPS on-line switch on the load devices one by one. The LCD display panel will display the load level by 0-25%, 26-50%, 51-75% and 76-100%.
- 2) If the UPS is overloaded the audible alarm will beep twice every second and the LCD display panel will display "OVERLOAD".
- 3) When the UPS is overloaded remove some load immediately.

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**4.2.5 Programmable Outlets Enable /Disable (Item 07)**

Interface	Setting
	<p><u>ENA: Programmable outlets are enabled. When the UPS goes to Battery mode the programmable outlets will supply power to the connected load for a duration equal to the timer setting in section 4.2.6 or until the battery becomes depleted, whichever occurs first.</u></p> <p>DIS: Programmable outlets are disabled. When the UPS goes to battery mode the programmable outlets will supply power to the connected load until the battery becomes depleted.</p>

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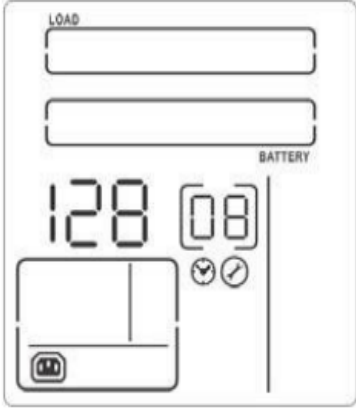
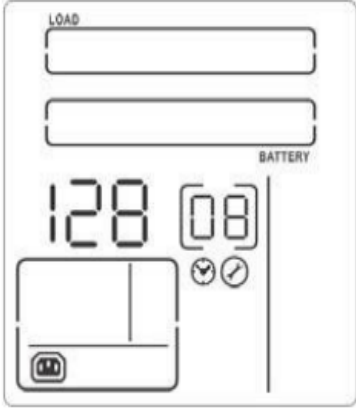
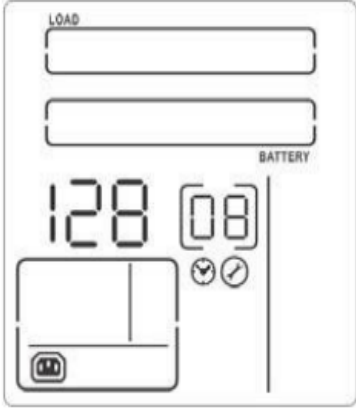
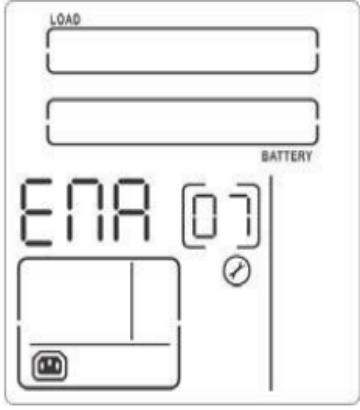
	<p><b><u>4.2.6 Programmable Outlets Setting (Item 08)</u></b></p> <table border="1"> <thead> <tr> <th data-bbox="420 267 821 321">Interface</th><th data-bbox="821 267 1871 321">Setting</th></tr> </thead> <tbody> <tr> <td data-bbox="420 321 821 776">  </td><td data-bbox="821 321 1871 776"> <p><u>0-999: Backup time in minutes that programmable output receptacles will operate in battery mode.</u></p> </td></tr> </tbody> </table> <p><a href="https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965">https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965</a></p>	Interface	Setting		<p><u>0-999: Backup time in minutes that programmable output receptacles will operate in battery mode.</u></p>
Interface	Setting				
	<p><u>0-999: Backup time in minutes that programmable output receptacles will operate in battery mode.</u></p>				
<p>to access a stored battery current magnitude value for use in calculating a battery remaining time indicative signal, such that, during</p>	<p>The accused product accesses a stored battery current magnitude value (e.g., battery current values obtained during calibration is stored for use of estimating battery remaining time during operation) for use in calculating a battery remaining time indicative signal (e.g., Battery Info which is an indicative of battery remaining time) such that, during a transitional shutdown delay interval of the apparatus that follows the detection of said interruption (e.g., stops supplying power to devices connected to the programmable outlet receptacles after Backup time when the input AC power fails and the accused device is on battery mode), said battery remaining time indicative signal (e.g., Battery Info which is an indicative of battery remaining time) is based on said stored battery current magnitude value that is unaffected by real time variations and transient loading of said battery current magnitude during said transitional shutdown delay interval (e.g., during calibration, remaining runtime is calculated based on load, which corresponds to current magnitude value because the output voltage value is fixed. The relationship between remaining time and load (i.e., current value) is stored as a calibration curve which is applied later for runtime estimation during normal operation. The stored current value is unaffected by real time variations and transient loading of said battery current magnitude during transitional shutdown because it is previously measured during the calibration step) and is instead based on a current magnitude in a steady state of said battery backup operation (e.g., the stored load/current value for</p>				

Exhibit 2

<p>a transitional shutdown delay interval of the apparatus that follows the detection of said interruption, said battery remaining time indicative signal is based on said stored battery current magnitude value that is unaffected by real time variations and transient loading of said battery current magnitude</p>	<p>runtime estimation is based on a load/current magnitude in a steady state of said battery backup operation, i.e., the load/current must be without fluctuating during calibration which simulates a steady state battery backup operation)</p> <p><b>5.3 Connect Devices to the UPS</b></p> <p>After the UPS has been turned on, devices (load) can now be connected to the UPS. For socket-type outputs, there are two kinds of outputs: programmable outlets and general purpose outlets. Connect non-critical devices to the programmable outlets and critical devices to the general outlets. <u>During power failure, you may extend the backup time to critical devices by enabling the programmable outlets (see Sections 4.2.5 and 4.2.6).</u></p> <ol style="list-style-type: none"> <li>1) With the UPS on-line switch on the load devices one by one. The LCD display panel will display the load level by 0-25%, 26-50%, 51-75% and 76-100%.</li> <li>2) If the UPS is overloaded the audible alarm will beep twice every second and the LCD display panel will display "OVERLOAD".</li> <li>3) When the UPS is overloaded remove some load immediately.</li> <li>4) When the UPS is in on-line mode, and the overload time exceeds the duration listed in the specification, the UPS will automatically transfer to bypass mode. At this time, if the bypass is enabled, the UPS will supply power to the load via bypass. If the bypass function is disabled, or the input voltage is not within the bypass acceptable range, the UPS will cutoff power to the load. After the overload is removed the UPS will return to on-line mode.</li> <li>5) After repetitive overloads, the UPS will be locked in bypass mode. Remove excess loads from the UPS output. Then restart the UPS.</li> </ol> <p><a href="https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965">https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&amp;revision=51f66a36-527f-4bc5-956f-b76a4dda7965</a></p>
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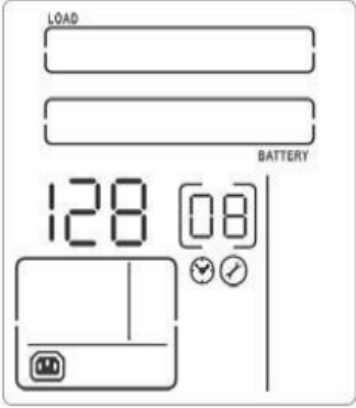
during said transitional shutdown delay interval and is instead based on a current magnitude in a steady state of said battery backup operation.

#### 4.2.5 Programmable Outlets Enable /Disable (Item 07)

Interface	Setting
	<p><u>ENA: Programmable outlets are enabled. When the UPS goes to Battery mode the programmable outlets will supply power to the connected load for a duration equal to the timer setting in section 4.2.6 or until the battery becomes depleted, whichever occurs first.</u></p> <p>DIS: Programmable outlets are disabled. When the UPS goes to battery mode the programmable outlets will supply power to the connected load until the battery becomes depleted.</p>

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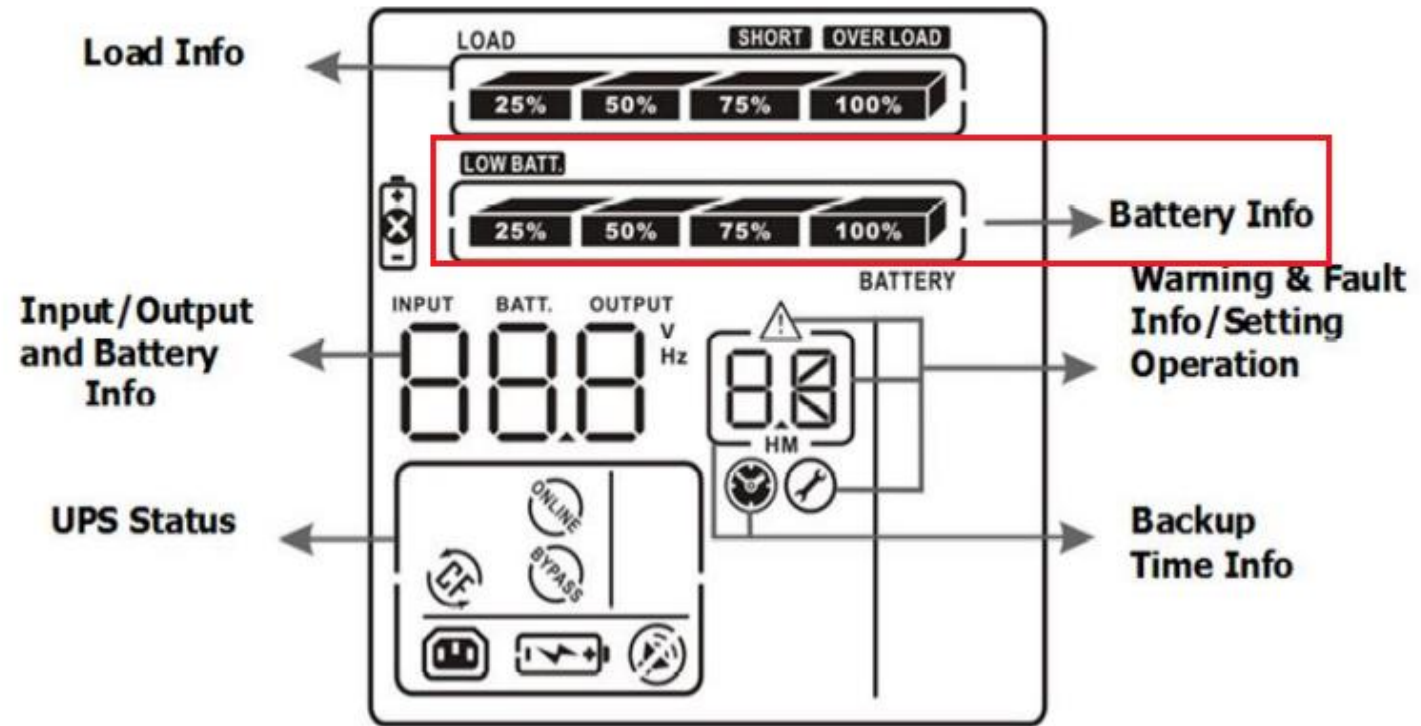
**4.2.6 Programmable Outlets Setting (Item 08)**

Interface	Setting
	<u>0-999: Backup time in minutes that programmable output receptacles will operate in battery mode.</u>

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>

## 2.9 LCD Display



### 2.9.1 Rack Display






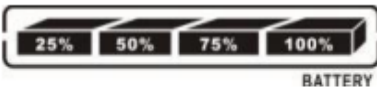

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## 2.10 LCD: Display and Functional Description

Display	Function
<b>Backup time information</b>	
	Indicates the backup time.
	Indicates the backup time. H: hours, M: minutes
<b>Warning &amp; Fault information</b>	

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	Indicates that the UPS is in bypass mode.
	Indicates that the UPS alarm is disabled.
	Indicates that the battery charger is working.
<b>Battery information</b>	
	Indicates the battery level by 0-25%, 26-50%, 51-75%, and 76 - 100%.
<b>LOW BATT.</b>	Indicates low battery.
	Indicates that there is something wrong with the battery.

<https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex-ups-um-standalone-rev-c.pdf?la=en&revision=51f66a36-527f-4bc5-956f-b76a4dda7965>



## UPS Battery Runtimes

**Battery**

**UPS-BPX-1000**

**Compatible UPS**

**UPS-1000-OL**



Percent Capacity	Watts	Number of Battery Packs				
		Internal	INT+1 EXT	INT+2 EXT	INT+3 EXT	INT+4 EXT
0	0	203	893	>16 hrs	>16 hrs	>16 hrs
10	80	48	211	419	659	925
20	160	24	107	212	334	468
30	240	15	68	135	213	298
40	320	11	49	97	152	213
50	400	8.4	37	74	116	163
60	48	6.7	30	59	93	130
70	560	5.6	24	49	77	107
80	640	4.7	20	41	64	90
90	720	4.1	17	35	55	78
100	800	3.5	15	31	48	68

Runtimes are expressed in minutes.

Typical runtimes based on fully charged, new batteries, operating under typical load conditions.

Times estimated assuming a switch mode power supply.

Runtimes are affected by battery age, ambient temperature, site specific usage patterns and load conditions.

[https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex\\_ups-battery-run-time-charts.pdf?la=en&revision=d977f498-ce4a-4544-be1c-afe244f936aa](https://www.ametekesp.com/-/media/ametekesp/downloads/manuals/ups-standalone/surgex_ups-battery-run-time-charts.pdf?la=en&revision=d977f498-ce4a-4544-be1c-afe244f936aa)